WHAT IS CLAIMED:

1. A mobile communications station for communicating among a plurality of mobile stations in a network in which stations are arranged in clusters of communication member stations, with one member station in each cluster being a head station for the cluster, each member station communicating with the network through at least one cluster head station, the cluster head stations communicating among other cluster head stations, said mobile communications station comprising:

an electronic memory circuit having network information stored therein;

a transceiver which transmits signals to and receives signals from mobile stations in the network; and

an electronic processor circuit which (i) evaluates a member beacon received from a first member station of the plurality of mobile stations through said transceiver, and (ii) determines whether to communicate with the first member station directly or to communicate with the first member station by routing messages through at least a cluster head station affiliated to said mobile communications station.

2. A mobile communications station according to claim 1, wherein the determination by said electronic processor circuit comprises evaluating a received member beacon from the first

member station.

3. A mobile communications station according to claim 2, wherein the determination by said electronic processor circuit further comprises evaluating a received signal strength indicator (RSSI) of the received member beacon.

4. A mobile communications station according to Claim 3, wherein said electronic processor circuit directs a message intended for the first member station via an affiliated cluster head station when the RSSI of the received member beacon from the first member station is below a predetermined threshold value.

5. A mobile communications station according to claim 4, wherein the determination by said electronic processor circuit further comprises evaluating a signal from the affiliated cluster head station.

6. A mobile communications station according to claim 5, wherein said electronic processor circuit evaluates an RSSI of the signal from the affiliated cluster head station.

7. A mobile communications station according to claim 6, wherein said mobile communications station directly communicates with the first member station when the member beacon RSSI of the first member station is greater than an RSSI of the affiliated cluster head plus an additional value.

8. A mobile communications station according to claim

7, wherein the additional value comprises a fraction of a maximum RSSI of the affiliated cluster head.

9. A mobile communications station according to claim 7, wherein the additional value comprises one-half of the maximum RSSI of the affiliated cluster head.

10. A mobile communications station according to claim 7, wherein the first member station and said mobile communications station are affiliated to a same cluster group.

11. A mobile communications station according to claim 7, wherein the first member station and said mobile communications station are not affiliated to a same cluster group.

12. A mobile communications station according to claim 7, wherein said electronic processor circuit determines at least one network cost and said mobile communications station directly communicates with the first member station when the member beacon RSSI of the first member station is greater than an RSSI of the affiliated cluster head plus an adjusted value minus the cost.

13. A mobile communications station according to claim 7, wherein said electronic processor circuit executes a handshake protocol with the first member station.

14. A mobile communications station according to claim 13, wherein a communications link with the first member station

is maintained.

15. A mobile communications station according to claim 1, wherein the determination by said electronic processor circuit comprises evaluating network bandwidth.

16. A mobile communications station according to claim 1, wherein the stored network information comprises received member beacon information.

17. A mobile communications station according to claim 1, wherein said electronic processor circuit determines a communications route based on at least one of a transmission power level of an affiliated cluster head, a required transmission power level to transmit to the first member station, node congestion of the affiliated cluster head, and bandwidth optimization.

18. A network communications apparatus comprising:

an electronic memory circuit which stores network information;

an electronic processor circuit which (i) directs communication between said apparatus and an affiliated network gateway and a target node, and (ii) decides which out of the affiliated network gateway and the target node to directly communicate with when transmitting messages for the target node;

and

a transmitter which transmits communication signals.

19. In a communications system for communication among plural stations in a network in which stations are arranged in clusters of communication stations with one of the stations in each cluster being a cluster head in each cluster, the cluster head station communicating among other cluster head stations, a method of operating a communications station comprising the steps of:

receiving a beacon message each from a first station of the plural stations in the network and a cluster head that is affiliated to the communications station;

evaluating the beacon messages; and

determining whether to directly communicate with the first station or to communicate with the first station by forwarding messages through a cluster head station affiliated to the communications station based on the evaluation of said evaluating step.

20. Computer executable code stored on a computer readable medium, the code for operating a communications station so as to communicate among a plurality of mobile stations in a network in which stations are arranged in clusters of communication member stations, with one member station being a

cluster head station in each cluster, a cluster head station communicating with at least one other cluster head station, said computer executable code comprising:

code to evaluate a beacon received by the communications station from a first member station;

code to direct messages, based on an evaluation of said evaluation code, to the first member station (i) through an affiliated cluster head station for directing to the first member station, or (ii) directly to the first member station.

21. In a communications system for communication among plural stations in a network in which stations are arranged in clusters of communication member stations each communicating with each other and one of the member stations in each cluster being a head station of the cluster, the cluster head stations communicating among other cluster head stations, a method for configuring the network of stations comprising the steps of:

receiving a beacon issued by a first member station in a second member station of the plural stations;

comparing a received signal strength indicator (RSSI) of the received beacon with a predetermined RSSI value; and

determining whether the second member station should communicate directly with the first member station based at least

in part on the comparison of said comparing step.

22. In a communications system for communication among a plurality of member stations in a network in which the member stations are arranged in clusters of communication member stations with one of the member stations in each cluster being a cluster head, a cluster head station communicating with at least one other cluster head station, a method of operating a communications station so as to route a message to a first member station of the plurality of member stations comprising the steps of:

receiving a signal from the first member station and determining a received signal strength (RSSI1) for the signal, and;

receiving a signal from an affiliated cluster head station and determining a received signal strength (RSSI2) for the signal;

determining a value (X) representing a relationship between a maximum received signal strength and a received signal strength for a signal between the first member station and the affiliated cluster head station; and

transmitting a signal directly to the first member station when:

RSSI1 > RSSI2 - X.

23. The method according to Claim 22, wherein the message to be sent to the first member station is relayed through the affiliated cluster head when the condition RSSI1 > RSSI2 - X is not met.

24. The method according to Claim 22, wherein the signal from the first member station is discarded when RSSI1 is below a predetermined value and the message to be sent to the first mobile station is relayed through the affiliated cluster head.

25. The method according to Claim 22, wherein the relationship of said determining step is the maximum received signal strength minus the received signal strength for a signal between the first member station and the affiliated cluster head station.

26. The method according to Claim 22, wherein the relationship of said determining step is approximated by the maximum received signal strength minus a fraction of the maximum received signal strength.

27. The method according to Claim 22, wherein the relationship of said determining step is approximated by the maximum received signal strength minus one-half of the maximum received signal strength.

28. A network communications apparatus comprising:

storage means for storing network information;

directing means for directing communication between said apparatus and either an affiliated network gateway or a target node;

determining means for determining which out of the affiliated network gateway or the target node to directly communicate with when transmitting messages for the target node; and

transmitting means for transmitting communication messages.

29. In a communications system for communication among plural member stations in a network in which member stations are arranged in clusters of communication member stations with one of the member stations in each cluster being a cluster head, a cluster head station communicating with at least one other cluster head station, a method of operating a communications station so as to route a message to a first member station of the plurality of stations comprising the steps of:

approximating an area of interference (A1) caused by a transmission between the communications station and the first member station;

approximating an area of interference (A2) caused by a transmission between the communications station and an affiliated cluster head station;

approximating an area of interference (A3) caused by routing a message from the affiliated cluster head station to the first member station; and

transmitting a message directly to the first member station when:

$$A1 < A2 + A3.$$

30. The method according to Claim 29 wherein the message to be sent to the first mobile station is relayed through the affiliated cluster head when the condition A1 < A2 + A3 is not met.

31. In a communications system for communication among plural member stations in a network in which member stations are arranged in clusters of communication member stations with one of the member stations in each cluster being a cluster head, a cluster head station communicating with at least one other cluster head station, a method of operating a communications station so as to route a message to a first member station of the plurality of stations comprising the steps of:

approximating an area of interference (A1) caused by a transmission between the communications station and the first

member station;

approximating an area of interference (A2) caused by a transmission between the communications station and an affiliated cluster head station;

approximating an area of interference (A3) caused by routing a message from the affiliated cluster head station to the first member station;

determining at least one network cost (cost) associated with transmitting a signal directly from the communications station to the first member station; and

transmitting a message directly to the first member station when:

$$A1 < A2 + A3 + cost.$$